Intra-segmental timing in sound change /aw/ in Philadelphia

Intro

Philadelphia (Labov et al. 2013)

- /aw/ raising and fronting
- /aw/ lowering and backing

Formant Trajectories

Have been investigated with generation as a categorical variable. (Jacewicz, Fox & Salmons 2011)

Wholistic measures compared against continuous variables. (Rudal & Kohn 2014)

With GAMs, it is possible to model trajectories against continuous variables. (Wood 2006)

Methods

Data

Philadelphia Neighborhood Corpus

19,517 tokens of pre-oral /aw/ 279 white speakers

Modelling

Generalized additive models & tensor product smooths

Outcome (F1)

Predictor (dob)

FAVE-extract

Subsampled to 20 measurements per token

Predictors

All non-linear effects and interactions between gender - log2(duration) - date of birth - measurement point

Full formant tracks extracted

Random intercepts - speaker - word

Random smooths measurement point by speaker

Results

formant tracks

falling F2 & single F1 excursion at midpoint (diphthong?)

max F1 excursion

Timing of F1 maximum shifts diachronically

Target of F1 maximum is more stable.

They interact with duration differently, over time

vowel space trajectories

F1 relative to F2

Delayed F1 maximum keeps F2/F1 difference larger for longer.

Conclusion

It is not straightforward to characterize /aw/ as a 2 part diphthong in Philadelphia.

Along with the shifts in vowel quality, there is a considerable shift in relative timing of vowel formant targets.

This puts /aw/ in line with some consonantal phonetic changes, such as Scottish derhoticization or Andalusian post-aspiration.

References


Labov, W., & Rosenfelder, I. (2012). Three tools and methods for very large scale measurements of very large corpora.


Further directions

Evaluating and improving quality of automated full formant track extraction.

Incorporating more linguistic (nasals) and social (education) factors into analysis.

Are the F1 and F2 qualities used differently for linguistic or sociolinguistic perception?